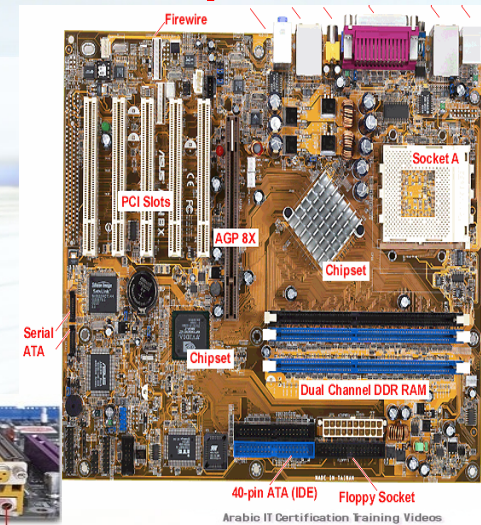
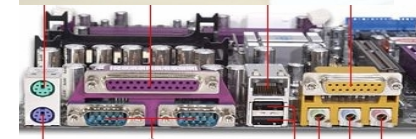


## Lesson 3

## System Board Components

- Chipsets
- Expansion slots
- Memory slots and external cache
- CPU and processor slots or sockets
- Power connectors
- Onboard disk drive connectors
- Keyboard connectors
- Peripheral port and connectors
- BIOS chip
- CMOS battery
- Jumpers and DIP switches
- Firmware

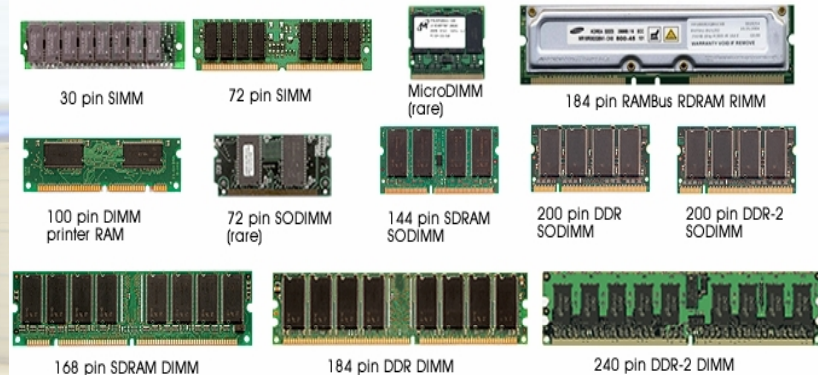


## Memory Slots and External Cache

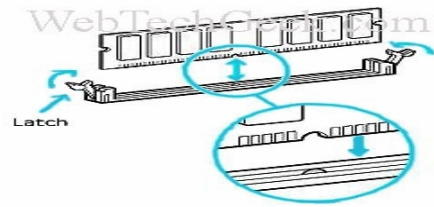
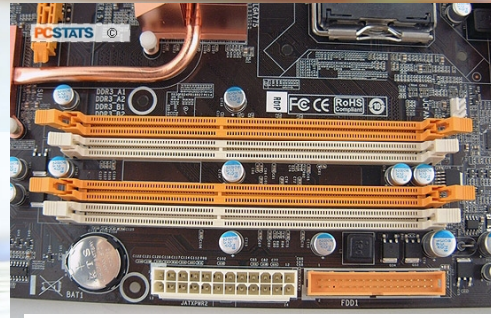
- Memory (RAM) slots are slots on a motherboard, they contain the modules that hold memory chips that make up primary memory,
- the memory used to store currently used data and instructions for the CPU.

## Form Factors for the most popular memory chips

Note, as well as the different number of pins, the different spacing of the slots in the connector-edge



- Small metal or plastic tabs on each side of the slot keep the memory module securely in its slot.



virtual RAM cache memory

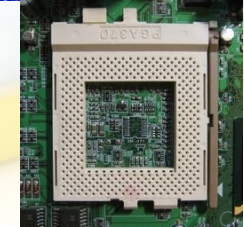
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Socket/Slot	Processors
Socket 4	Pentium 60/66, Pentium 60/66 OverDrive
Socket 5	Pentium 75-133, Pentium 75+ OverDrive, AMD K5
Socket 6*	486DX4, 486 Pentium OverDrive
Socket 7	Pentium 75-200, Pentium 75+ OverDrive, Pentium MMX, AMD K6
Super Socket 7	AMD K6-2, K6-III
Socket 8	Pentium Pro
Slot 1	Pentium II, Pentium III, Celeron, and all SECC and SECC2
Slot 2	Pentium II Xeon, Pentium III Xeon
Slot A	Early AMD Athlon
Socket 370	PPGA processors, including Pentium III and Celeron
Socket 423	Early Pentium 4
Socket A (Socket 462)	AMD Athlon, Athlon XP, Athlon XP-M, Athlon MP, Thunderbird, Duron, Sempron
Socket 478	Pentium 4, Pentium 4 Extreme Edition, Celeron
Socket 479	Pentium M, Celeron M
Socket 486	80486
Socket 563	AMD low-power mobile Athlon XP-M
Socket 603	Intel Xeon
Socket 604	Intel Xeon with Micro FCPGA package
Socket 754	Athlon 64, Sempron, Turion 64
Socket 771	Xeon 50x0 dual-core
Socket T (LGA 775)	Pentium 4, Pentium D dual-core, Celeron D, Pentium Extreme Editi

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## Central Processing Unit (CPU) and Processor Socket or Slot

- The “brain” of any computer
- usually the component that has either a fan or a heat sink

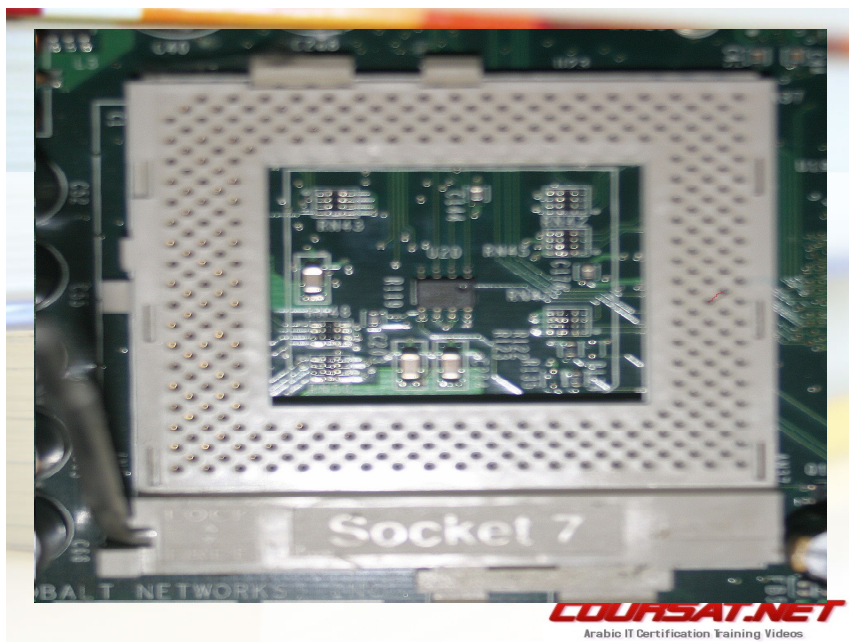
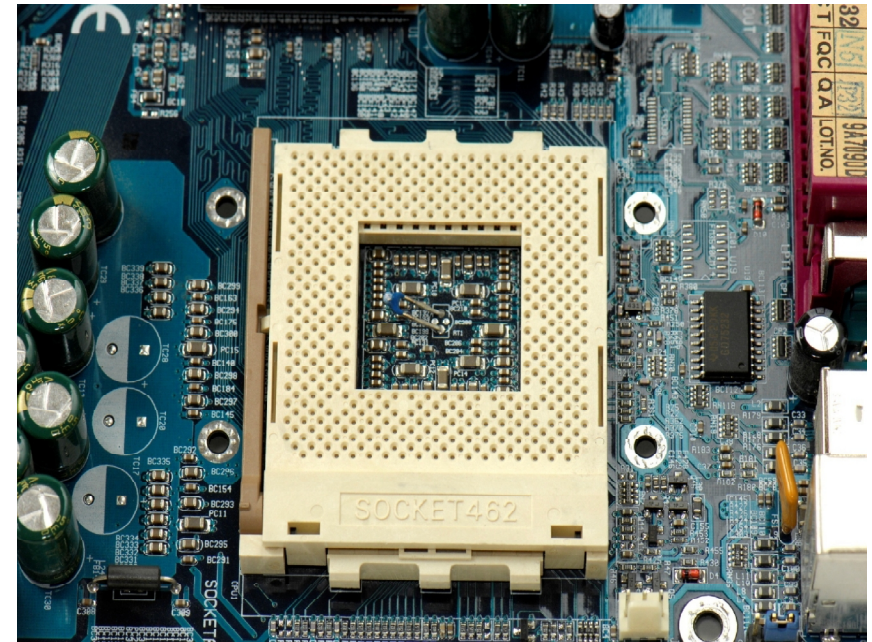
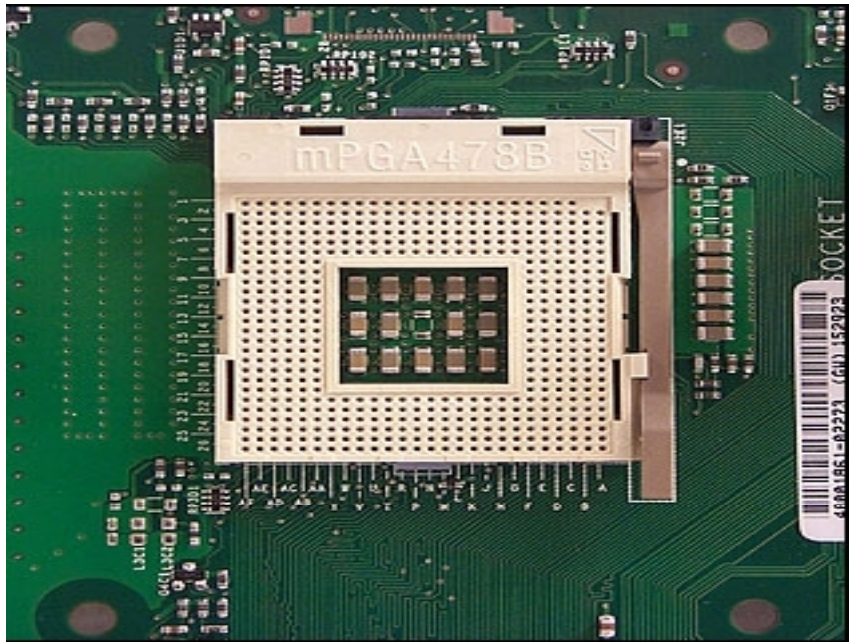


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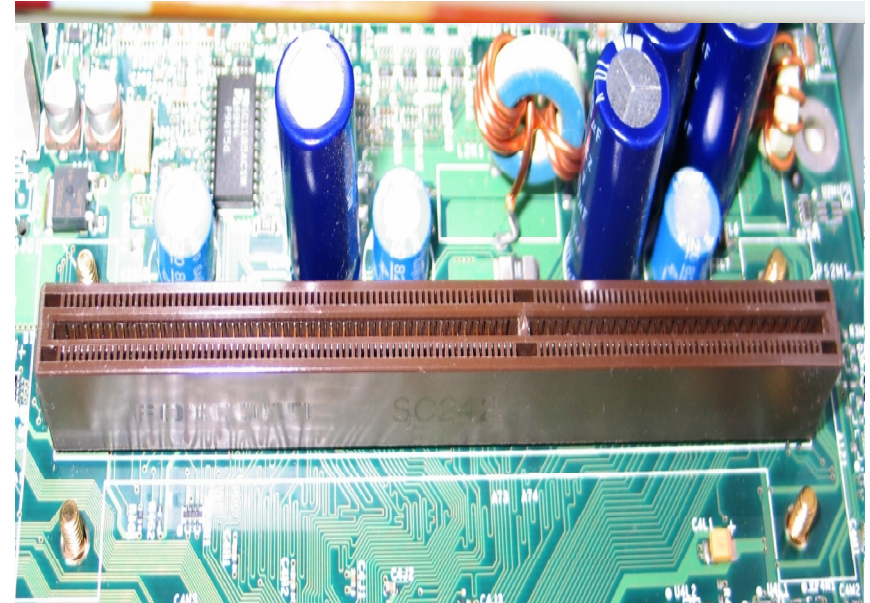
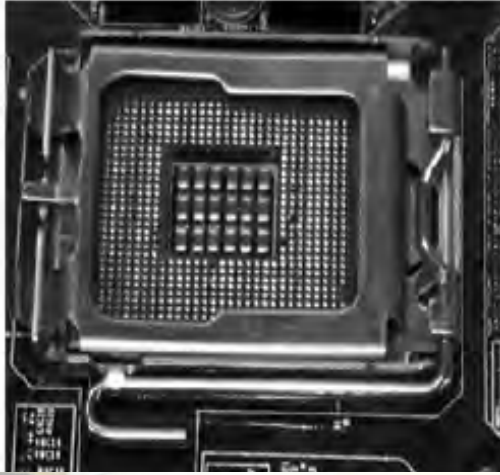
Socket/Slot	Processors
Socket 940	Athlon 64 FX (FX-51), Opteron
Socket F (Socket 1207)	Replaces Socket 940 when used with Opteron multiprocessor systems
Socket AM2	AMD single-processor systems, replaces Socket 754 and Socket 939
Socket S1	AMD-based mobile platforms, replaces Socket 754 in the mobile sector
PAC418	Itanium
PAC611	Itanium 2
Socket 939	Athlon 64, Athlon 64 FX, Athlon 64 X2, Opteron 100-series

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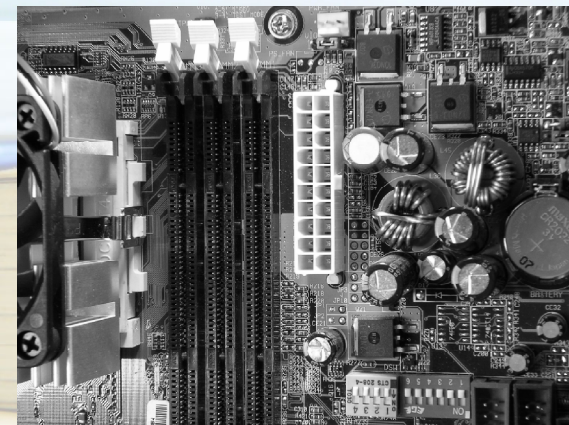




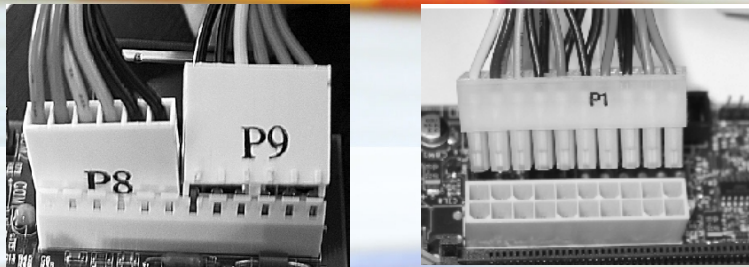
## zero insertion force (ZIF) sockets

- Modern CPU sockets have some sort of mechanism in place that reduces the need to apply the considerable force to the CPU that was necessary in the early days of personal computing to install a processor.

## Power Connectors



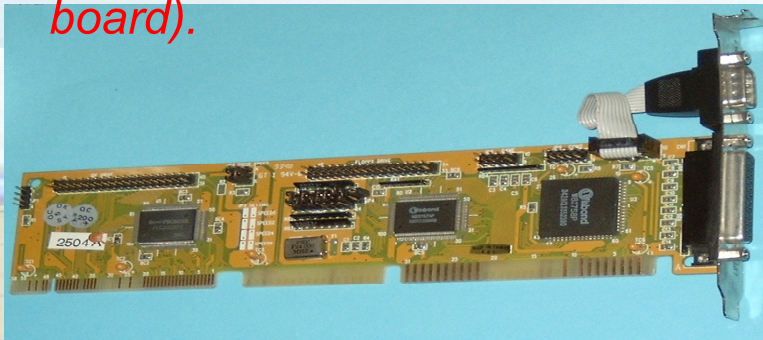




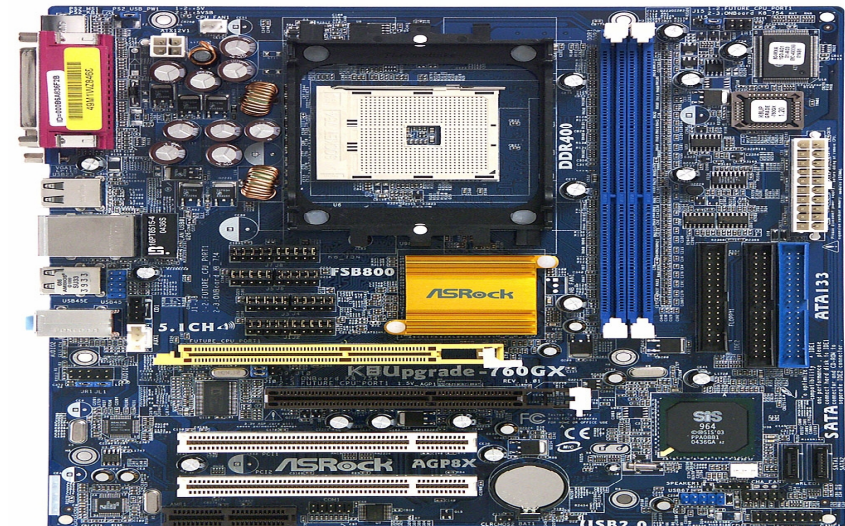
## Onboard Floppy and Hard Disk Connectors

- *drive interfaces*
- There are two main types:
- *floppy drive interfaces*
- *hard disk interfaces.*
- *onboard, as opposed to being on an expansion card (off-board).*
  - SATA,
  - Scsi

*IDE hard disk interfaces. (off-board).*

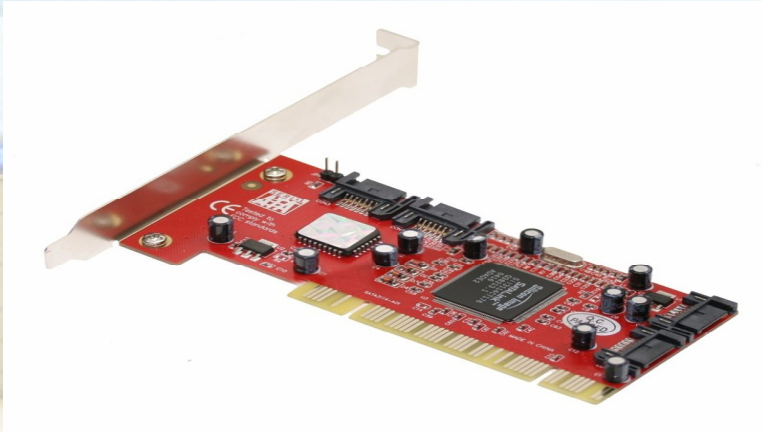


**IDE hard disk interfaces. (on-board).**



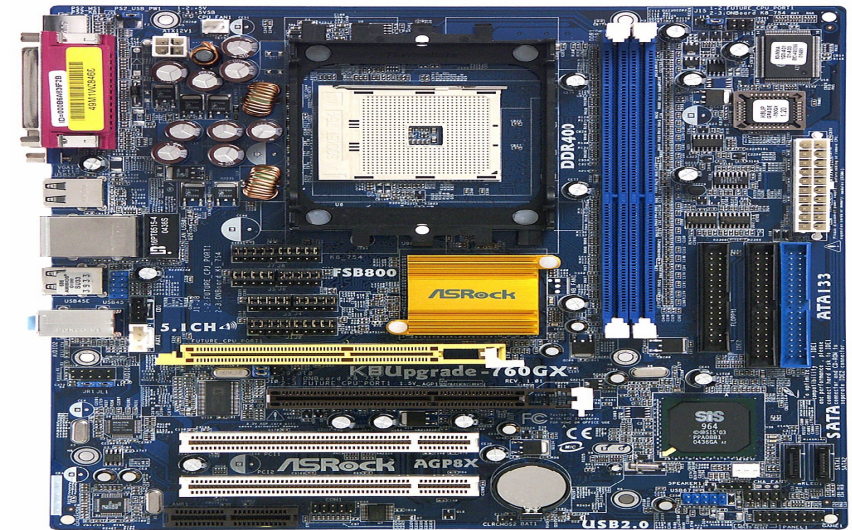


## Sata interfaces. (off-board)



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## Sata interfaces. (on-board)

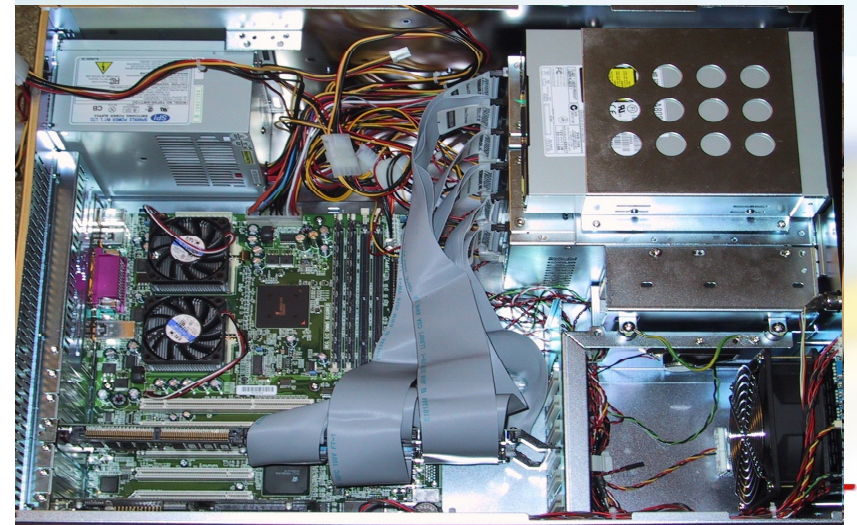


## Scsi interfaces. (off-board)



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## Scsi interfaces. (in-board)

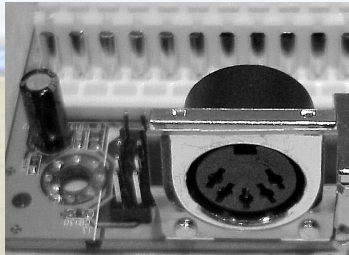




## Keyboard Connectors

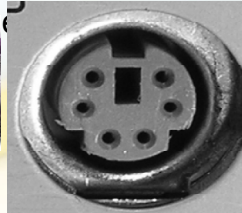
### AT

- 5-pin DIN



### PS/2 connectors

- 6-pin mini-DIN
- green connectors on mice and the keyboard connectors



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## Wireless keyboard and mouse Bluetooth technology or a proprietary RF implementation



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## USB-attached keyboards

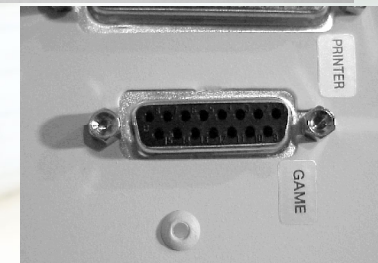


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## Peripheral Ports and Connectors



DC power in  
Analog modem RJ-11  
Ethernet NIC RJ-45  
S-video out  
DVI-D out  
SVGA out  
Parallel (on top)  
Standard serial  
Mouse (on top)  
Keyboard  
S/PDIF (out)  
USB



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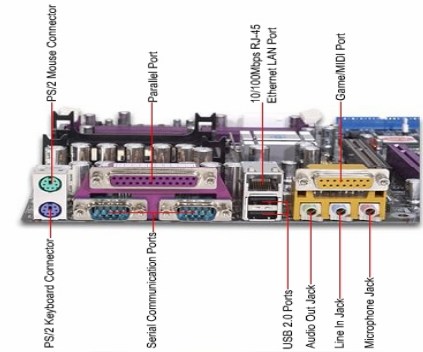
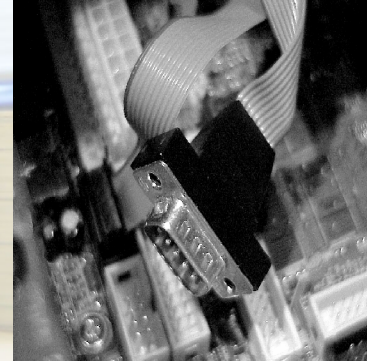


## A game port & Sound card jacks

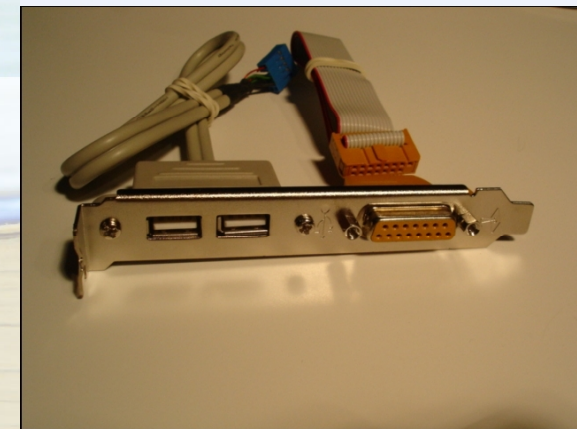
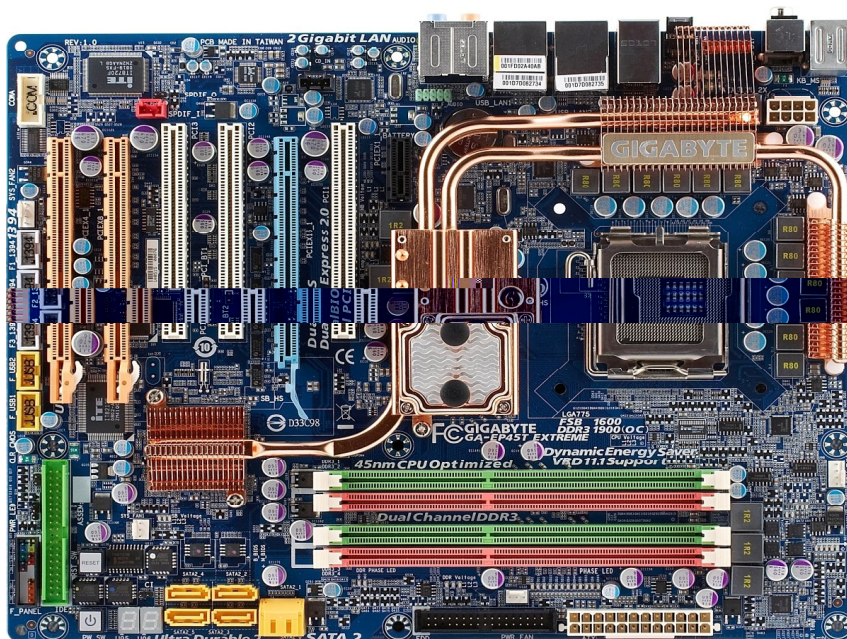


## Motherboard Attachment

- header connection
- Direct-solder method



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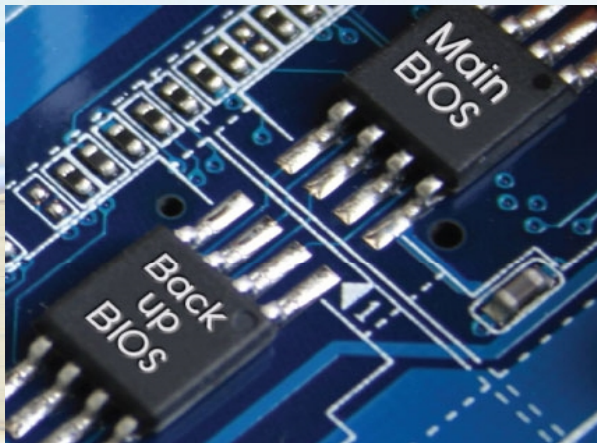
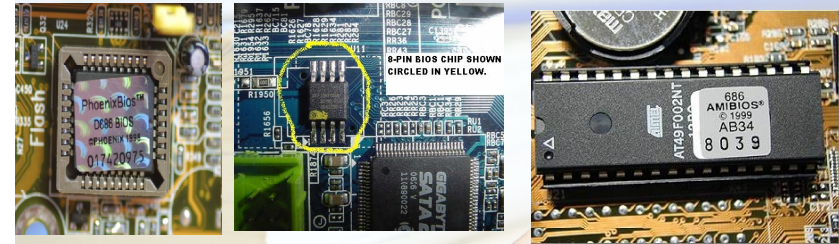
## BIOS Chip

- BIOS is an acronym for Basic Input/Output System
- It is the boot firmware program on a PC that controls the computer from the time you start it up until the operating system takes over.
- When you turn on a PC, the BIOS first conducts a basic hardware check, called a Power-On Self Test (POST), to determine whether all of the attachments are present and working.
- Then it loads the operating system into your computer's random access [memory](#), or [RAM](#).
- The BIOS also manages data flow between the computer's operating system and attached devices such as the hard disk, video card, keyboard, mouse, and printer.
- The BIOS stores the date, the time, and your system configuration information in a battery-powered, non-volatile memory chip, called a [CMOS](#) (Complementary Metal Oxide Semiconductor) after its manufacturing process.

## Firmware

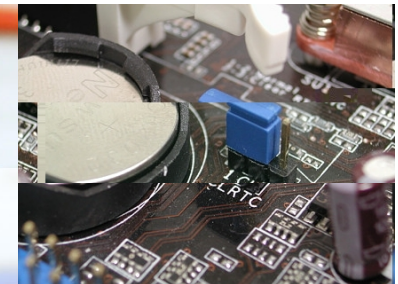
**firmware** Software encoded on hardware. The BIOS routine and its chip is an example of firmware

the chip usually has a sticker or printing on it from one of the major BIOS manufacturers (AMI, Phoenix/Award, Winbond, and so on)



## CMOS Battery

- Date
- Time
- Hard drive configuration
- Memory
- Your PC keeps these settings in a special memory chip called the Complimentary Metal Oxide Semiconductor (CMOS) chip.
- Actually, CMOS (usually pronounced *see-moss*) is a type of memory chip;
- The BIOS starts with its own default information and then reads information from the CMOS, such as which hard drive types are configured for this computer to use, which drive(s) it should search for boot sectors, and so on.
- Any overlapping information read from the CMOS overrides the default information from the BIOS.

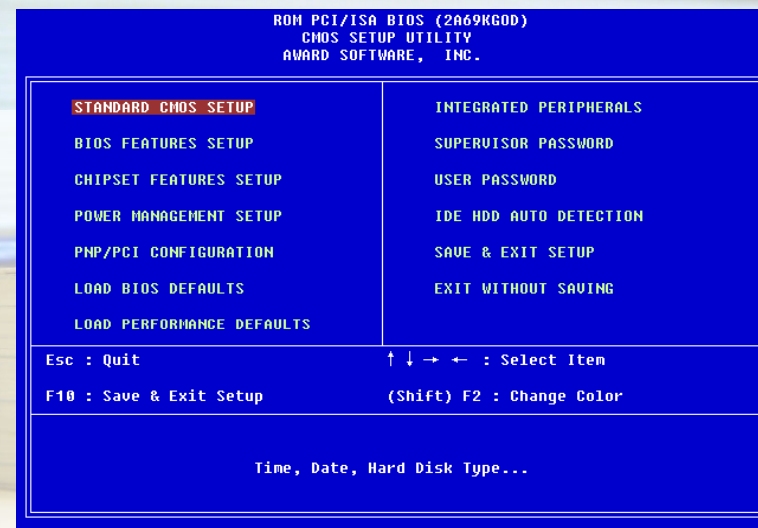




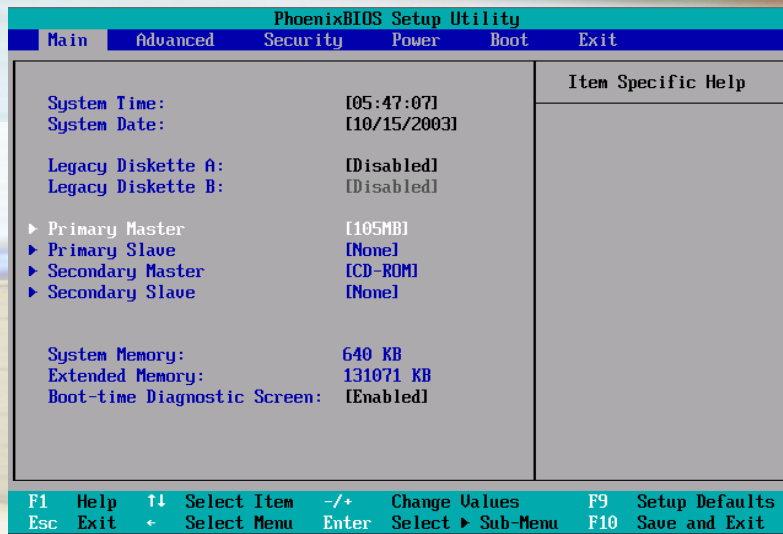
## What's the difference between BIOS and CMOS?

- The BIOS is the program that starts a computer up, and the CMOS is where the BIOS stores the date, time, and system configuration details it needs to start the computer.
- The BIOS is a small program that controls the computer from the time it powers on until the time the operating system takes over. The BIOS is firmware, which means it cannot store variable data.
- CMOS is a type of memory technology, but most people use the term to refer to the chip that stores variable data for startup. A computer's BIOS will initialize and control components like the floppy and hard drive controllers and the computer's hardware clock, but the specific parameters for startup and initializing components are stored in the CMOS.

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## Jumpers and DIP Switches

- These two devices are used to configure various hardware options on the motherboard.
- For example, some processors use different voltages
- Individual jumpers are often labeled with the moniker JPx (where x is the number of the jumper).

